



US009404270B2

(12) **United States Patent**
Condon

(10) **Patent No.:** **US 9,404,270 B2**
(45) **Date of Patent:** **Aug. 2, 2016**

(54) **PANEL AND MOUNTING SYSTEM**

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/852,992**

(22) Filed: **Sep. 14, 2015**

(65) **Prior Publication Data**

US 2016/0138273 A1 May 19, 2016

Related U.S. Application Data

(60) Provisional application No. 62/080,587, filed on Nov.
17, 2014.

(51) **Int. Cl.**

E04F 13/08 (2006.01)

E04F 13/12 (2006.01)

B32B 15/085 (2006.01)

B32B 7/12 (2006.01)

B32B 15/20 (2006.01)

(52) **U.S. Cl.**

CPC **E04F 13/0803** (2013.01); **B32B 7/12**
(2013.01); **B32B 15/085** (2013.01); **B32B**
15/20 (2013.01); **E04F 13/0866** (2013.01);
E04F 13/12 (2013.01); **B32B 2307/3065**
(2013.01); **B32B 2607/00** (2013.01)

(58) **Field of Classification Search**

CPC E04B 5/10; E04B 9/30; E04B 1/70;
E04B 1/7069; E04B 2/88; E04B 2/96; E04B
2/885; E04B 1/7038; E04B 2/7069; E04F
13/0875; E04F 13/0846; E04F 13/0898;
E04F 13/0803; E04F 13/0866; E04F 13/12;

E04F 13/072; E04F 13/0816; E04F 13/0805;
E04F 13/083; B32B 7/12; B32B 15/085;
B32B 15/20; B32B 2307/3065; B32B
2607/00; E06B 9/01

USPC 52/235, 202–203, 483.1, 309.14,
52/506.06

See application file for complete search history.

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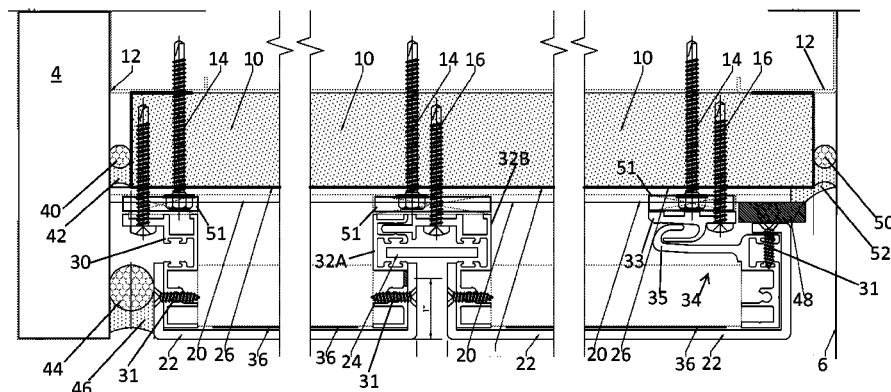
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(57) **ABSTRACT**

A composite panel system for attaching to a wall system includes a layer of continuous insulation covering the wall system and a plurality of vertical girts affixed the wall system such that the continuous insulation lays between the wall system and the vertical girts. Composite panels are mounted to a perimeter frame of extrusions, generally two horizontal and two vertical. The panel frame horizontal extrusions are mounted to the vertical girts by fasteners. In some embodiments, gypsum and a membrane are used in lieu of continuous insulation.

11 Claims, 3 Drawing Sheets



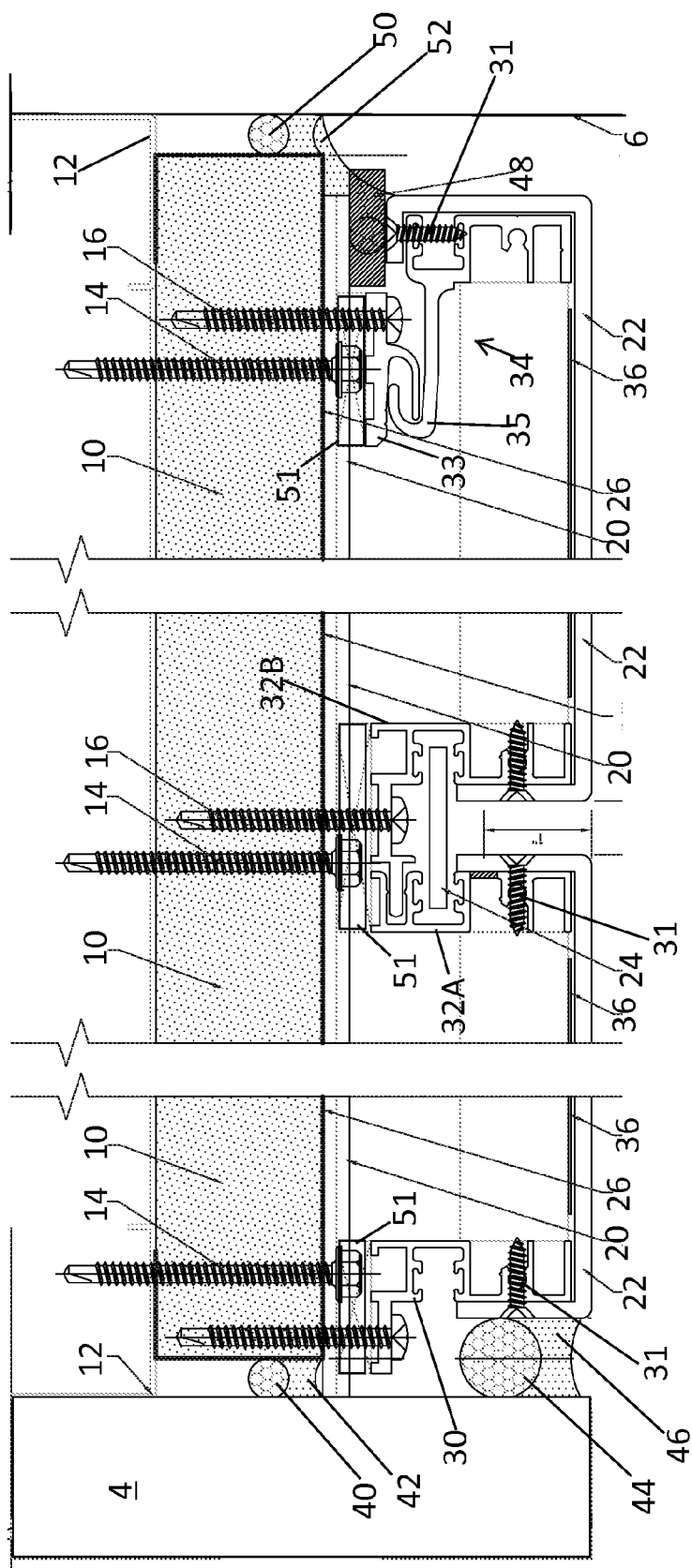


Fig. 1

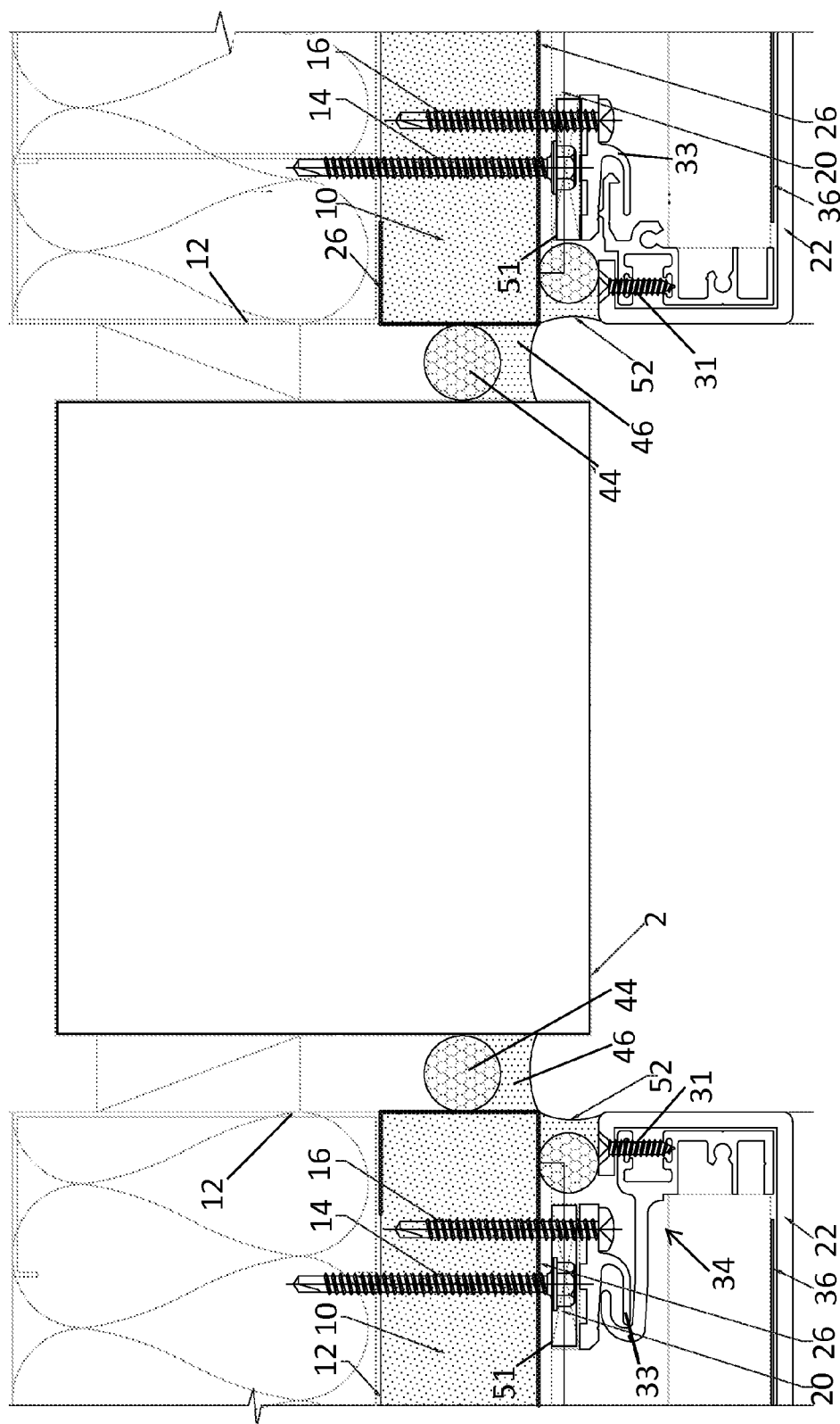


Fig. 2

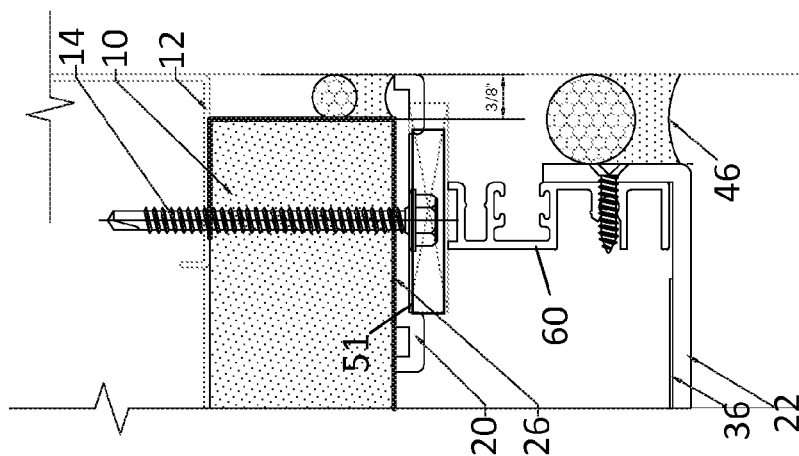


Fig. 5

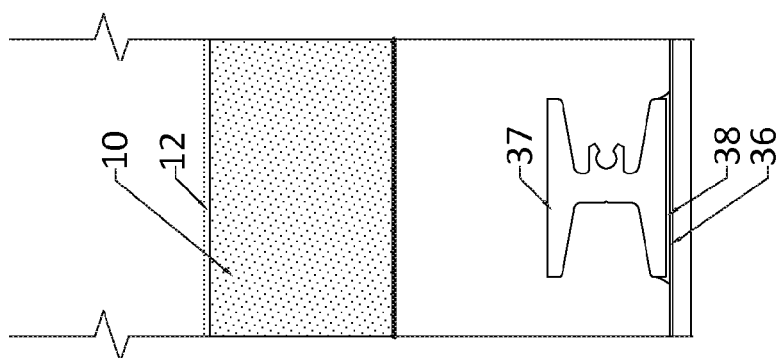


Fig. 4

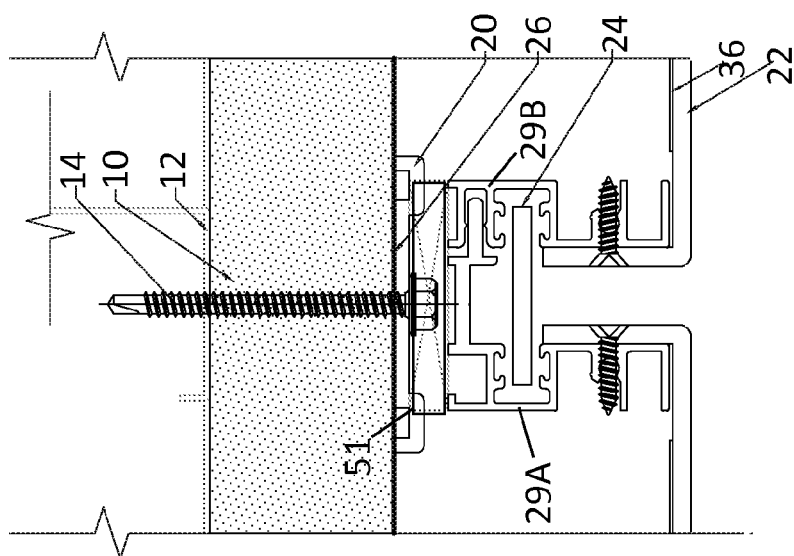


Fig. 3

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PANEL AND MOUNTING SYSTEM**CROSS-REFERENCE TO RELATED APPLICATION**

This application claims the benefit of U.S. provisional application No. 62/080,587 filed on Nov. 17, 2014, the disclosure of which is incorporated by reference.

FIELD

This invention relates to the field of building materials and more particularly to a panel system for installation over studs or cement walls of a building.

BACKGROUND

Weather extremes and therefore building codes vary from state to state and locality to locality. Prior construction components and designs provide sheathing over continuous insulation, thereby reducing wind and moisture penetration, but do not provide tested, narrow, attachment systems for composite metal panels with decorative colors and textures.

One prior attempt required steel girt systems dimensioned up to 1½ inches over the face of the continuous insulation, creating architectural challenges due to a large increase in wall dimension and the steel-space between the panels and the continuous insulation. This prior attempt required foam insulation to be applied to the inside of the steel studs which is costly and often impractical. Other prior attempts promoted a system without deflection stiffeners or impact resistant features or water testing for windows; which can lead to installation problems.

What is needed is a panel and attachment system that will adapt to building codes that vary from localities with low chances of extreme wind storms to localities that have high chances of such, along with variations from extreme cold to extreme heat.

SUMMARY

In one embodiment, a composite panel system for attaching to a wall system is disclosed. The composite panel system includes a layer of continuous insulation covering the wall system and a plurality of vertical girts affixed to the wall system such that the continuous insulation lies between the wall system and the vertical girts. The composite panels are assembled on a perimeter frame of extrusions, generally two perimeter-horizontal, two perimeter-vertical. The horizontal members of this frame are mounted to the vertical girts by fasteners. Several composite panels are held in place, each composite panel with two horizontal extrusions held to adjacent vertical girt members by fasteners.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention can be best understood by those having ordinary skill in the art by reference to the following detailed description when considered in conjunction with the accompanying drawings in which:

FIG. 1 illustrates a cross-sectional view of an installation of metal composite panels on metal studs.

FIG. 2 illustrates a cross-sectional view of an installation of metal composite panels on metal studs with intervening window (or door).

FIG. 3 illustrates a plan view of the mating of two vertical members and two metal composite panels.

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FIG. 4 illustrates a plan view of a stiffener member of the metal composite panel system.

FIG. 5 illustrates a plan view of a vertical jamb of the metal composite panel system at the edge of the panel system opening.

DETAILED DESCRIPTION

Reference will now be made in detail to the presently preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Throughout the following detailed description, the same reference numerals refer to the same elements in all figures.

Note that, throughout this description, exemplary composite panels **22** are described, though the disclosed system is equally anticipated for many other types and compositions of panels and this application is not limited to any particular type, style, or shape of panels **22**. The composite panels **22** may have metal skins and a planar core. The skins may be aluminum, fire retardant and 0.020 inches thick, and the core may be polyethylene. Further, exemplary extrusions **29A/29B/30/32A/32B/34** are shown of specific shape as tested by the inventor, but the disclosed shape is one of many anticipated cross-sectional shapes and any cross-sectional shape is anticipated and included here within.

Note that, throughout this description, the drawings illustrate an optional rain-screen insert **24** between composite panels **22**. It is fully anticipated that, when the optional rain-screen insert **24** is absent, a silicone seal (or other seal) is placed between the panels **22** instead.

The disclosed system enables installation of panels **22** such that the exterior surface of the metal panels **22** is mounted in as little as 2½ inches from the face of the continuous insulation **10** with improved installation time and tested to meet building code requirements for high wind areas.

Referring to FIG. 1, a cross sectional view of an installation of metal composite panels **22** on metal studs **12** is shown. In this exemplary installation, horizontal members **30/32A/32B/33/34** are installed, holding panels **22** (e.g., composite panels). Any installation having any number of horizontal members **30/32A/32B/33/34** and any number of panels **22** is anticipated. Note that although composite panels **22** are used as examples of such panels **22** throughout the description, other panels **22** are equally anticipated such as those with the brand name of Trespa® (Registered TM of Trespa) panels.

The panel system preferably installs over a layer of continuous insulation **10**. Continuous insulation, as known in the industry, is insulation that is continuous across all structural members without thermal bridges (other than fasteners) and service openings. Although it is preferred to install the panel system over continuous insulation **10**, it is equally anticipated that the disclosed panel system be installed over other continuous insulation products having an air-water barrier, for example, RMAX® (Registered TM of Rmax Operating LLC) or mineral wool. It is equally anticipated that the disclosed panel system can be installed over gypsum with a weather resistant membrane over the gypsum, in lieu of the continuous insulation.

An example of such continuous insulation **10** Thermax® (Registered Trademark of the Dow Chemical Company, see ESR 1659 for an evaluation report of Thermax®). A plurality of vertical girts **20** are mounted vertically over the continuous insulation **10** and in some embodiments is secured to the wall structure (e.g. steel studs **12** in this example or cement walls) by fasteners **14** that pass through the vertical girts **20**, through the continuous insulation **10** and tap into the wall structure (e.g., steel studs **12**, or cement walls). Vertical girts **20** provide

lateral support to the wall panel, primarily, to resist wind loads. When the wall structure includes steel studs **12**, it is preferred that the steel studs **12** be at a minimum 18 gauge steel studs, installed 16 inches on center. Although any suitable material is anticipated, in this example, the vertical girts **20** are made of aluminum having a depth of approximately 0.25 inches or more, normally continuous, but not required to be so.

The thickness of the continuous insulation **10** is determined to meet energy requirements for steel framed walls in the targeted climate zones, preferably between 1.5 and 3 inches thick. Optionally, tape and/or silicone are applied to the insulation **10** to create a further barrier to wind, air, vapor, and fire. For example, the installation shown includes a layer of waterproof tape **26** covering the continuous insulation **10** beneath the vertical girt **20** and around the edge of the continuous insulation **10**.

Although the order of installation is not limited in any way, in one example, once the continuous insulation **10** and vertical girt **20** is installed, a series of horizontal members **30/32B/33** are affixed to the vertical girts **20** by fasteners **16**. The fasteners **16** screw into the vertical girts **20**.

Shown are horizontal members **30/32A/32B/33/34**. The lower horizontal member **33/34** is mounted to the vertical girt **20** next to the starting point, for example, floor system **6**; which is preferably, though not required, sealed by a floor gasket **50** and/or sealant **52**, thereby reducing wind, vapor, and/or moisture penetration. The lower horizontal member **33/34** has two parts. The first part of the lower horizontal members **33/34** is a receiver **33**. The second part **34** of the lower horizontal member **33/34** is mounted to the composite panel **22** and has a hook end **35** that interfaces with the receiver **33**. In this way, the receiver **33** is affixed to the vertical girt **20** by the fastener **16**, then the lower section of composite panel **22** is affixed to the body **34** by a fastener **31**, and then, the assembly including the composite panel **22** is hooked together by this lower horizontal member **33/34**.

The intermediate horizontal members **32A/32B** connect two composite panels **22**, each affixed to the intermediate horizontal members **32A/32B** by fasteners **31**. One section **32B** of the intermediate horizontal members **32A/32B** is affixed to the vertical girt **20** by fasteners **16**. In some installations, a rain-screen insert **24** is installed within the intermediate horizontal members **32A/32B** after the fasteners **16** are installed. The rain-screen insert **24** provides some resistance to wind, vapor, and/or moisture penetration plus, in some installations, has aesthetic attributes. It is anticipated that the rain-screen insert **24** be made of the same or similar materials as is the composite panels **22** and that the rain-screen insert **24** be colored as desired, either the same or different colors than the composite panels **22**.

The upper horizontal member **30** connects the top of the last composite panel **22** to the vertical girt **20**. The upper horizontal member **30** is affixed to the vertical girt **20** by fasteners **16**. The edge of the last composite panel **22** is affixed to the upper horizontal member **30** by fasteners **31**. In some installations, a gasket **40** and/or sealant **42** provide additional resistance to wind, vapor, and/or moisture penetration between the insulation **10** and the overhang structure **4**. Additionally, to reduce wind, vapor, and/or moisture penetration in behind the composite panels **22**, an upper horizontal member gasket **44** and/or sealant **46** is optionally applied between the upper horizontal member **30** and the overhang structure **4**.

The composite panel **22** is made of any suitable material, preferably fire resistant composite aluminum, and is for example colored or finished to suit the desired appearance and corrosion resistance.

In some embodiments, the composite panel **22** further includes an impact plate **36**. The impact plate **36** is typically installed in the factory, allowing for final assembly of composite panels **22** that meet various impact standards. For example, by adding a first thickness of impact plate **36**, the composite panel **22** is specified for building codes that require passing of a test that includes a nine pound, 2"x4" missile **D** traveling at 34 MPH. If the building codes require passing a more stringent test, such as a test that includes a nine pound, 2"x4" missile **E** traveling at 55 MPH, a heavier gauge impact plate **36** is installed. It is anticipated that the impact plate **36** be affixed to the back surface of the composite panel **22** using an adhesive, preferably a silicone adhesive such as Dow 983 from the Dow Corning Company. Although any suitable material is anticipated, it is preferred that the impact plate **36** be made of steel.

In one embodiment, the composite panel **22** is made of 4 mil aluminum (fire resistant) and the entire assembly meets fire code requirements, possibly including NFPA285.

Optional shims **51** provide for wall adjustment (i.e. to achieve plumb steel stud or concrete wall), as needed.

Referring to FIG. 2, a schematic view of an installation of metal composite panels **22** on metal studs **12** with intervening window **2** is shown. The window is made of, for example, glass, plastic and/or aluminum components. The window may also be termed a storefront or curtain wall. In this, the window **2** is sealed against the insulation layer **10** by a gasket **44** and/or sealant **46**. For brevity reasons, the physical mounting of the window **2** to the wall system **12** (e.g. metal studs **12**) is not shown.

Referring to FIG. 3, an intermediate vertical member **29A/29B** of the metal composite panel system is shown. Note that the optional rain-screen insert **24** is shown mounted within the intermediate vertical member **29A/29B**.

Referring to FIG. 4, a stiffener member **37** of the metal composite panel system is shown. The stiffener member **37** is affixed to the impact plate **36** or directly to an inside surface of the composite aluminum panel **22** with an adhesive **38** such as a silicone adhesive (e.g., Dow 983 from the Dow Corning Company). The stiffener is preferably made from aluminum, though any suitable structural material is equally anticipated such as steel or iron. Panels that have the stiffener **37** installed have passed testing to ASTM E 330 (85-125 pounds per square foot) and have been shown to meet Florida Building Code deflection requirements.

Referring to FIG. 5, a vertical member **60** located at the edge of composite panel system of the metal composite panel system is shown.

When installed without shims **51**, it is anticipated that, in some installations, the panels **22** system members **30/33/32A/32B/29A/60** are separated from the face of the insulation layer **10** by approximately 1/4", which was not possible in prior systems that utilize horizontal and vertical girts.

Equivalent elements can be substituted for the ones set forth above such that they perform in substantially the same manner in substantially the same way for achieving substantially the same result.

It is believed that the system and method as described and many of its attendant advantages will be understood by the foregoing description. It is also believed that it will be apparent that various changes may be made in the form, construction and arrangement of the components thereof without departing from the scope and spirit of the invention or without sacrificing all of its material advantages. The form herein before described being merely exemplary and explanatory embodiment thereof. It is the intention of the following claims to encompass and include such changes.

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What is claimed is:

1. A composite panel system for attaching to an external surface of a wall system, the composite panel system comprising:

a plurality of continuous insulation panels attached to a wall system;

a plurality of composite panels, each panel comprising a first and a second metal skin, the first metal skin bonded to a first side of a planar core and the second metal skin bonded to an opposing side of the planar core;

a plurality of vertical girts mounted vertically and located between a header of the wall system and a base of the wall system, anchored by fasteners passing through one of the the vertical girts through one of the continuous insulation panels and into the wall system;

composite panels of the plurality of composite panels are mounted between vertical girts of the vertical girts; and

a plurality of horizontal members, each horizontal member mounted to the vertical girts by fasteners; a first edge of one of the composite panels is fastened to a first horizontal member of the plurality of horizontal members and a distal second edge of the one of the composite panels is fastened to an adjacent second horizontal member of the plurality of horizontal members.

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2. The composite panel system of claim 1, wherein the planar core is polyethylene.

3. The composite panel system of claim 1, wherein the planar core is made of a fire retardant.

4. The composite panel system of claim 1, wherein the metal skins are made of aluminum.

5. The composite panel system of claim 4, wherein the aluminum is 0.020 inches thick.

6. The composite panel system of claim 1, further comprising impact plates held to the composite panels with an adhesive layer.

7. The composite panel system of claim 1, wherein the plurality of continuous insulation panels further comprise a sealing system that includes tape and silicone.

8. The composite panel system of claim 6, further comprising a stiffener affixed to each of the impact plates by an adhesive.

9. The composite panel system of claim 1, further comprising a stiffener affixed to the composite panels by an adhesive.

10. The composite panel system of claim 1, wherein the wall system comprises steel studs.

11. The composite panel system of claim 1, wherein the wall system comprises cement walls.

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